Instructions: Legibly complete each of the following on lined paper and submit on Gradescope. Collaboration and outside help (in any form) are forbidden.

1. Compute an orthonormal basis for $\mathbb{R}^4$ using $v_1 = \begin{bmatrix}1\\1\\1\\1\end{bmatrix}$, $v_2 = \begin{bmatrix}-2\\1\\2\\1\end{bmatrix}$, $v_3 = \begin{bmatrix}3\\2\\1\\2\end{bmatrix}$, and $v_4 = \begin{bmatrix}1\\-1\\-1\\-2\end{bmatrix}$.

2. Compute the orthogonal complement to $W = \{(a, b, c, d) \in \mathbb{R}^4 : 2a - b + c = 0 = a - b - d\}$.